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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JEFFREY B. HOKE,  
RONALD M. HECK, and  
FRED M. ALLEN

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Appeal 2007-4469  
Application 10/002,272  
Technology Center 1700

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Decided: November 30, 2007

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Before EDWARD C. KIMLIN, THOMAS A. WALTZ, and  
KAREN M. HASTINGS, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's

non-final rejection of claims 48-53 and 55-58, which are the only claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b)<sup>1</sup>.

We AFFIRM.

## I. BACKGROUND

The invention relates to a device for treating the atmosphere to catalytically convert atmospheric pollutants to less harmful materials. Claim 48 is illustrative:

48. A device for treating the atmosphere to catalytically convert atmospheric pollutants to less harmful materials comprising an outer surface of a motor vehicle component which is exposed to a flow of ambient air, said outer surface being coated with a catalyst composition, said catalyst composition being protected with a porous overcoat of carbon.

The Examiner relies upon the following references as evidence of unpatentability:

Adachi	JP 52-122290	Oct. 14, 1977
Okamoto	JP 55-023039	Feb. 19, 1980,
Dettling	WO 98/02235	Jan. 22, 1998

All page references herein are to the translations provided by the USPTO.

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<sup>1</sup> While the rejection on appeal is not a final rejection, the claims have been twice rejected within the meaning of 35 U.S.C. § 134. In an appeal in which claims have been at least twice rejected, the Board has jurisdiction as discussed in *Ex parte Lemoine*, 46 USPQ2d 1432 (Bd. Pat. App. & Int. 1995).

Claims 48, 51-53 and 56-58 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Dettling in view of Adachi. To reject claims 49, 50, and 55, the Examiner adds Okamoto.

Although all the claims have also been rejected under the judicially created doctrine of obviousness-type double patenting, both the Appellants and Examiner agree these grounds of rejection are not part of this appeal (Ans. 3, Br. 5). Appellants state they will file a terminal disclaimer upon allowance of at least one pending claim (Br. 5).

The Examiner withdrew the rejection of all the claims under 35 U.S.C. 112, second paragraph as indefinite, and thus this ground is also not before us (Ans. 2).

Appellants do not argue claims 48, 51-52, and 56-58 separately with any reasonable specificity (Br. 7-10). Therefore, we select the broadest independent claim 48 to decide the issues on appeal regarding these claims. We will also address the dependent claims that were argued separately.

## II. DISCUSSION

### with Findings of Facts

The issues on appeal arising from the contentions of Appellants and the Examiner are:

(A) Have Appellants shown that the Examiner reversibly erred in rejecting claim 48, 51-53 and 56-58 because there is no motivation to use the protective coating of porous carbon taught in Adacho on the catalyst composition of Dettling?

(B) Have Appellants shown that the Examiner reversibly erred in rejecting claims 49, 50 and 55 because there is no motivation to use a hydrophobic protective material with a protective coating of porous carbon on the catalyst composition of Dettling?

#### Issue A

##### Findings of Fact

A preponderance of the evidence of record supports the following Findings of Facts (FF):

1. Dettling discloses that an outer surface of a motor vehicle component is coated with a catalyst composition (p. 5: 8-17). The catalyst composition may be a base metal (e.g., of an oxide of manganese) optionally combined with a precious metal (e.g., platinum); these are customarily used as catalysts for engine exhaust gas (p. 7: 17 to pg. 8:13).
2. Dettling discloses the catalyst composition may be protected with a porous protective coating (p. 5:23-29; *see also* pg. 15:24-29).
3. Dettling's claims 18 and 28 broadly recite using a protective coating whereas claims 19 and 29 specify some characteristics of the coating, and claims 20 and 30 still further specify that the coating may be plastic material, such as polytetrafluoroethylene (pp. 19-21; pg. 15: 29-33).
4. Adachi discloses that catalyst(s) (e.g., metal oxides of manganese, platinum) for treating exhaust gases (e.g., engine exhaust gases) to reduce nitrogen oxide may be covered with a porous protective layer of activated carbon (pp. 1-2).
5. Adachi describes that the catalyst treats the exhaust gases to reduce nitrous oxide (p. 2). Compounds present in the exhaust gas, such as the

sulfur oxide and lead, will deteriorate the catalyst (pp. 2-3). The activated carbon protects the catalyst by absorbing these compounds, e.g., sulfur oxide and lead (p. 3).

6. Adachi teaches the protective material may be applied onto the surface of the catalyst using a granulator (p. 5).

7. Activated carbon is also known as activated charcoal and is defined as highly absorbent carbon obtained by heating granulated charcoal to exhaust contained gases, resulting in a highly porous form with a very large surface area.<sup>2</sup>

8. One of ordinary level of skill in the art would be an engineer or scientist who designs catalytic devices and methods to treat gases as exemplified in Dettling and Adachi.

9. It is general knowledge that the most commonly found air pollutants include ozone, sulfur dioxide, and lead<sup>3</sup>.

10. Okamoto describes that water repellent activated carbon is formed by fixing hydrophobic material, such as polytetrafluoroethylene, onto the activated carbon (p. 4). This will aid the carbon in absorbing sulfur dioxide (p. 7) in environments where moisture may deteriorate the adsorption performance of the activated carbon (p. 3).

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<sup>2</sup> "activated carbon." *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. 15 Nov. 2007. <Dictionary.com [http://dictionary.reference.com/browse/activated\\_carbon](http://dictionary.reference.com/browse/activated_carbon)>

<sup>3</sup> See "What are the Six Common Air Pollutants?"  
<<http://www.epa.gov/oar/urbanair/index.html>>

## PRINCIPLES OF LAW

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The legal question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). See also *KSR*, 127 S. Ct. at 1734 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”)

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 127 S. Ct. at 1739. The question to be asked is “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *KSR*, 127 S. Ct. at 1740. The Supreme Court also noted in *KSR* that an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 127 S. Ct. at 1741.

Also, the Court held “that when a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an

arrangement, the combination is obvious.” *KSR*, 127 S. Ct. at 1740, *quoting* from *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282 (1976).

Further, the Court stated “...when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *KSR*, 127 S. Ct. at 1740.

Moreover, one of the ways in which a claim’s subject matter can be proved obvious is by establishing that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the claims. *KSR*, 127 S. Ct. at 1742.

Further, it has been generally held that it is *prima facie* obvious to combine two compositions, each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for that same purpose. *See In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980) and *In re Crockett*, 279 F.2d 274, 278 (CCPA 1960).

### III. OPINION

#### Claims 48, 51, 52, and 56-58

The Examiner finds, and Appellants do not dispute, that Dettling describes every limitation in claim 48 except for the porous overcoat of carbon (Br. 7-10). Appellants also do not dispute that Adachi teaches a porous overcoat of carbon to protect a catalyst from deteriorating (FF 4). Thus, the issue on appeal is whether the combination of Dettling and Adachi would have taught or suggested to one of ordinary skill in the art the use of a porous overcoat of carbon as required by claim 48.

Appellants contend that one would not have been motivated to substitute the absorbent carbon protective coating of Adachi for the



“resistive or repellant” coating of Dettling (Br. 9) as proposed by the Examiner.

We disagree. First, Dettling shows the motor vehicle part in contact with ambient air, covered with a catalyst, with the generic teaching that a protective coating was known (FF 1-2). Even though the specific example in Dettling is a protective coating of plastic, Dettling also teaches the broad concept of any protective coating, for example, via the inclusion of claims 18 and 28 (FF 3). Second, Adachi is evidence that porous activated carbon overcoats were known in the catalyst art as a protective coating for the same catalysts as used in Dettling (FF 4). As the Examiner aptly pointed out, the protective coating taught in Adachi would have protected the catalyst from contaminants and aging, just as the coating in Dettling would have (Ans. 8-11). When a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result. *KSR*, 127 S. Ct. at 1740. There is no evidence on this record to refute the Examiner’s assertion that the substitution of Adachi’s protective material for the protective material of Dettling would have yielded a predictable result (Ans. 9).

Even assuming *arguendo*, however, that Appellants are correct that it would not have been obvious to *substitute* the porous overcoat of carbon for the porous overcoat of hydrophobic material, we are not persuaded that the claims are unobvious over the prior art. Each of Dettling and Adachi describes the use of a different protective coating for the same catalyst(s) (FF 1-4). Using *both* protective coatings, each for their known purpose of protecting the catalyst layer of Dettling from deteriorating, would have been

prima facie obvious to one of skill in the art. The idea of combining the protective coatings comes from their having been individually taught in the prior art, each for the same purpose of protecting the catalyst from deteriorating. *See Kerkhoven*, 626 F.2d at 850.

Thus, it would have been obvious to one of ordinary skill in the catalyst art to substitute or, in the alternative, to add the protective coating taught by Adachi to the protective coating disclosed in Dettling.

Yet another way in which a claim's subject matter can be proved obvious is by establishing that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the claims. *KSR*, 127 S. Ct. at 1742.

In this case, there was a known problem at the time the invention was made, and it was the same problem discussed by Appellants of needing to remove undesirable components from the gas (i.e. air) stream so that the catalyst can work efficiently and maintain its strength (FF 4-5). The same solution as discussed by Appellants, namely using a porous overcoat of activated carbon, is taught by Adachi (FF 5). The same end result as contemplated by Appellants of removing the sulfur oxides from the air to be treated is taught (Spec. 11: 4-28; FF 5). The only question is whether it would have been obvious to add this known coating to the catalyst of Dettling.

The Supreme Court noted in *KSR* that although the teaching, suggestion, motivation test "captured a helpful insight," an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences

and creative steps that a person of ordinary skill in the art would employ.”  
127 S. Ct. at 1741.

The knowledge that sulfur dioxide and lead were common air pollutants would have been within the skill in the art (FF 8 and 9). Therefore, we determine that using an activated carbon overcoat, as taught in Adachi, in order to absorb the known common pollutants of sulfur dioxide and lead in the atmosphere, *in addition to* the porous hydrophobic protective overcoat of Dettling would have been prima facie obvious to one of ordinary skill in the art. The burden of proof has shifted to Appellants. We note that Appellants have not established by evidence or technical reasoning that one of ordinary skill in the art would not have used these two coatings together, each for its known purpose of providing a protective coating on the catalyst to prevent degradation of the catalyst’s effectiveness. Indeed, we note Appellants describe using a plastic coating with a porous carbon coating as part of their invention.

One of ordinary skill in the art would have known to combine the two protective coatings each for their known protective effects on the catalyst. *See KSR*, 127 S. Ct. at 1739-40 (The question to be asked is “whether the improvement is more than the predictable use of prior art elements according to their established functions.”). The “improvement” herein appears to be no more than the predictable use of two well known materials, each known individually to protect the same or similar catalysts from prematurely degrading.

#### Dependent Claim 53

Appellants additionally argue that the particular types of carbon (which are listed in the alternative) in claim 53 are not taught or suggested in

either reference (Br. 10). We disagree. As the Examiner aptly points out, Adachi does teach and suggest activated granular carbon (Ans. 13; FF 6). Furthermore, by its very definition, activated carbon is a granulated substance (FF 7).

#### Issue B

##### Dependent Claims 49, 50, 55

Appellants contend that there is no reason to replace the hydrophobic layer of Dettling with the carbon layer of Adachi and then place a hydrophobic layer over the carbon, and that such a modification would destroy the intended function of the original coating of Dettling (Br. 14-15). We do not find these arguments persuasive as to any error in the legal conclusion of obviousness of these claims. First, Okamoto is no longer even necessary to reject these claims in view of our determination above that it would have been obvious to use the carbon protective material of Adachi *in combination* with the hydrophobic porous protective material of Dettling, each for their known protective effects on the catalyst.

Second, although Okamoto is not "necessary", its teachings bolster the findings above. Okamoto describes that treating activated carbon with a water repellant (hydrophobic) agent to enhance the carbon's effectiveness as an absorbent when moisture was present was known (FF 10). This is yet another reason why one of ordinary skill in the art would use both substances, namely a hydrophobic material and activated carbon, to protect the catalyst in Dettling from undesirable contaminants in the environment.

Third, if the protective carbon layer was *substituted* for the protective plastic layer of Dettling, as proposed by the Examiner, Okamoto provides a sufficient reason why one of ordinary skill in the art would have placed a

hydrophobic material on the activated carbon for the reasons discussed by the Examiner (Ans. 15-18). Note also that only claims 49 and 50 require the hydrophobic material to overcoat the carbon. All the other claims, including claim 55, permit a hydrophobic material (e.g., plastic) to be either under or over the carbon layer, or even to be applied as a mixture with the carbon (Spec. 13: 4-19). Thus, Appellants' Specification attaches no criticality to the placement of the hydrophobic coating. There is no evidence of record to rebut the prima facie case of obviousness presented herein.

#### IV. CONCLUSION

For the foregoing reasons and those stated in the Answer, we determine that the Examiner has established a prima facie case of obviousness in view of the reference evidence. This prima facie case has not been adequately rebutted by Appellants' arguments. Therefore we AFFIRM each ground of rejection presented in this appeal.

#### V. DECISION

The Examiner's decision is AFFIRMED.

Appeal 2007-4469  
Application 10/002,272

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

tf/lis

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